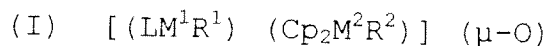


PATENT CLAIMS

1. A binuclear, oxygen-bridged, bimetallic complex of the general formula I



where:

M^1 = Al, Ge, Zr or Ti;

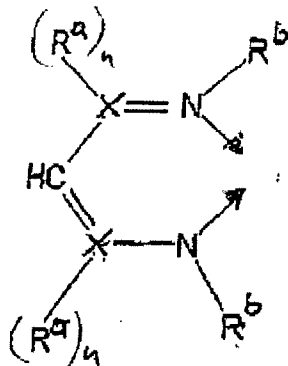
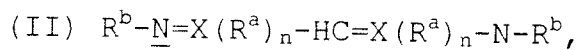
M^2 = Zr, Ti, or Hf;

Cp = cyclopentadienyl;

R^1 , R^2 = methyl, ethyl, i-propyl, t-butyl, halogen, phenyl, alkylphenyl, $SiMe_3$; and

L = a bidentate, doubly heteroatom-coordinated organic chemical ligand, which together with the metal M^1 forms a 5 or 6-membered ring.

2. The bimetallic complex according to Claim 1, characterized in that it is a heterobimetallic complex, preferably where M^1 = aluminum and M^2 = zirconium, more preferably a complex of the form $[(LAlMe) (Cp_2ZrR^2)] (\mu-O)$, where R^2 is Me or Cl.
3. The bimetallic complex according to Claim 1 or 2, characterized in that the ligand L has the following composition (formula II):

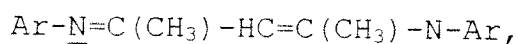


where: X = C or P;

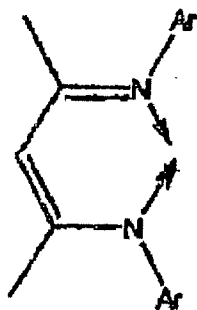
R^a, R^b = H, methyl, ethyl, i-propyl, t-butyl, halogen, phenyl, alkylphenyl, trimethylsilyl;

$n = 1$ if X = C; $n = 2$ if X = P.

4. The metallocene complex according to Claim 3, characterized in that the ligand L has the following composition:



where Ar = 2,6-iPr₂C₆H₃



5. A method for producing a binuclear, oxygen-bridged, bimetallic complex according to one of Claims 1 through 4, characterized in that a precursor complex of the formula $\text{LM}^1\text{R}^1(\text{OH})$ is reacted with a metallocene precursor complex $\text{Cp}_2\text{M}^2(\text{R}^2)_2$ or $\text{Cp}_2\text{M}^2\text{MER}^2$ or $\text{Cp}_2\text{M}^2\text{HX}$, where X = halogen, preferably in an inert solvent.
6. A catalyst preparation for the polymerization of olefins, which contains at least one complex according to one of Claims 1 through 4 and at least one cocatalyst.
7. The catalyst preparation according to Claim 6, characterized in that the cocatalyst is an alkylaluminumoxane, preferably methylaluminumoxane (MAO).
8. A use of binuclear, oxygen-bridged, bimetallic complexes made of a transition metallocene and an

organic aluminum, germanium, zirconium, or titanium compound which does not contain a cyclopentadienyl group, in particular according to one of Claims 1 through 4, as polymerization catalysts.

9. The use according to Claim 8, characterized in that it is at least one heterobimetallic complex.
10. The use according to Claim 8 or 9, characterized in that the catalyst is used in connection with a cocatalyst of the type $[\text{MeAlO}]_x$, trialkyl aluminum, or alkylhaloaluminum, in particular with methylaluminoxane (MAO).

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